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Mr. Vouras graduated from the Teachers College of Connecticut, New Britain, and attended the Graduate School of Geography, Clark University, during the academic years 1949-50 and 1950-51. He is now at The Massanutten Academy, Woodstock, Virginia.

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Dr. Cramer took his advanced graduate work at the University of Chicago. He taught three years at the J. Sterling Morton Junior College in Cicero, Illinois, and was Assistant Professor in Geography at Memphis State College for one year. He is now an industrial research analyst with the Library of Congress.

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VOLUME L OCTOBER, 1951 NUMBER 7

NEW ZEALAND FORESTRY IN TRANSITION

THEO L. HILLS
University of Texas

The contribution of one country to the economy of another is usually thought of in terms of raw materials or manufactured goods which currently play an important role in the regular trade between two countries. So often forgotten are the vast grasslands or forests that may have been developed from a small qantity of seed imported into a country many years before. The immensely rich pastoral industry of New Zealand is based largely on exotic grasses imported from the British Isles and Western Europe. Not on the same scale as the grasslands but playing an ever increasing role in the economy of New Zealand, are the 800,000 acres of exotic forests, the dominant species of which originate on the Pacific coast of North America. Today, paper, motor vehicles, farm machinery and gasoline are most important contributions by North America to New Zealand's economy. Of ever growing importance, tho, are these exotic forests that have developed from the seed of the North American Monterey pine (Pinus radiata), Douglas fir (Pseudotsuga taxifolia), Western Yellow pine (Pinus ponderosa), Western red cedar (Thuya plicata), and Lodgepole pine (Pinus murrayana).

Together with several European species, these exotic trees are supplying New Zealand with vital timber supplies and within a decade will probably be providing the bulk of pulp and paper requirements. Not only New Zealand but Australia and the Pacific Islands also are benefiting from the successful afforestation scheme. New Zealand will probably, within one or two decades, be supplying these countries with most of their softwood and paper requirements. The vast forests of North America and Scandinavia, from whence the dominant species of these exotic forests came, will be supplanted as the major source of Australasian paper requirements.

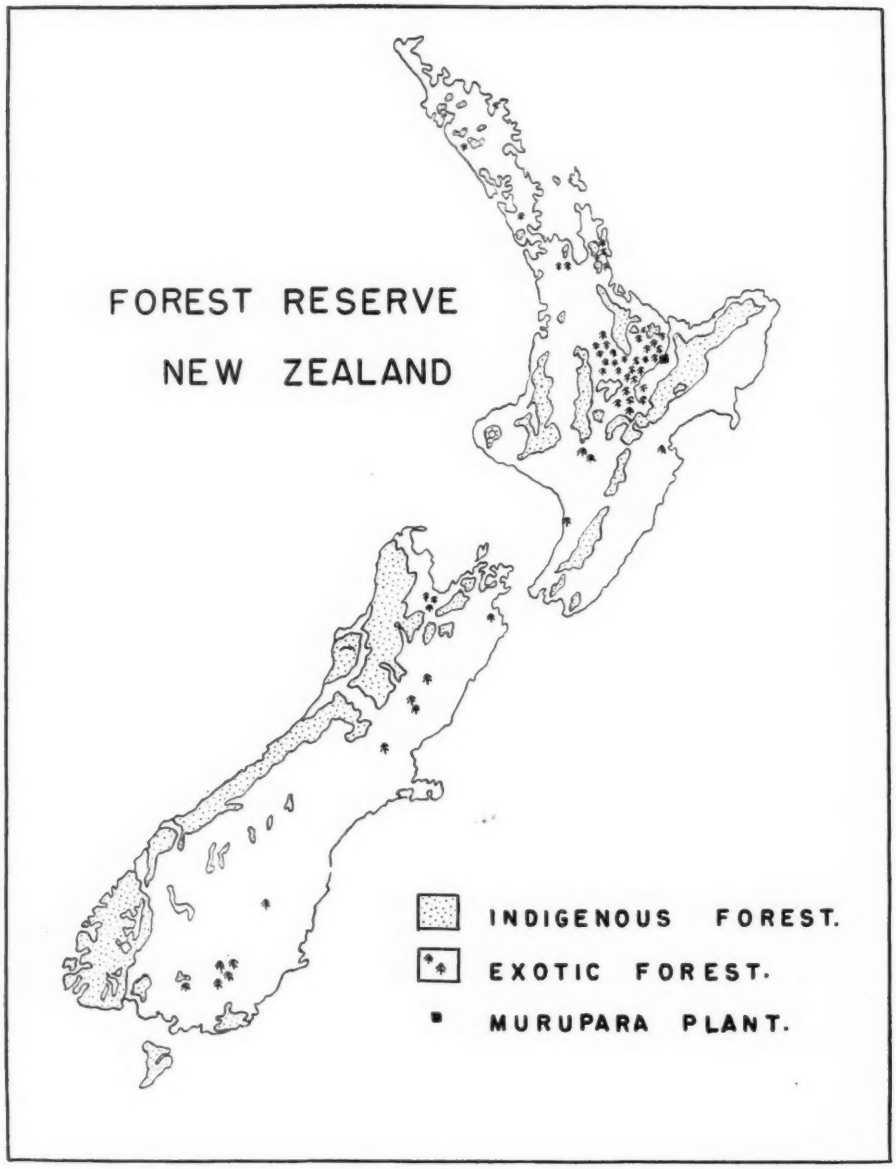
FOREST RESERVE
NEW ZEALAND
INDIGENOUS FOREST.
EXOTIC FOREST.
MURUPARA PLANT.

FIG. 1

The initiation and development to export status of an afforestation scheme within a period of three to four decades is a rather remarkable achievement for a young and a small country. The circumstances which necessitated the initiation of such a scheme and its rapid development are to be described in this article.

Indigenous Forests

The last century has seen a great transformation in the New Zealand landscape. Before the arrival of the white man, the country was predominately forested. However, since his introduction of the firestick, the axe, the grazing animal, and the plough the whiteman has greatly hastened the change-over to grassland. Even at the commencement of settlement, the forest cover had been greatly diminished and in 1847 only 27 million acres remained. Today indigenous forests cover only 9 million acres (Fig. 1).*

The indigenous forests of New Zealand, as a whole, belong to that great division of the earth's vegetation called rain-forest—a community with its most extreme development in the tropics. New Zealand rain-forest may be naturally divided into two classes: subtropical rain-forest and subantarctic rain-forest. The former class is a mixed community of broad-leaved trees and conifers, and the latter a pure community of one or more of the species of beech (Nothofagus). Between these two classes there are many intermediates, the one graduating into the other. The subtropical rain-forest is generally confined to the coastal lowland and montane belts. It consists of many kinds of tall, medium-sized and small trees together with a dense undergrowth of numerous species of shrubs and ferns. Woody lianes and huge epiphytes are characteristic and bryophytes abound. Beech forest may be divided into milling-forest and protection forest. Various types of millable beech appear at decreasing altitude southward from 38°S. Protection forest is essentially high mountain forest.

Tho the forest-tree species of New Zealand number about 112 only a few are of value as timber trees. There are others which possess very high qualities but which are now to be obtained only in such small qantities that they are of little commercial importance. At present only six species are being used to any extent by saw mills and of these five are softwood timbers. Rimu (Dacrydium

* All photos were taken by the Publicity Department of the Prime Ministers Department, New Zealand Government, and are reproduced at their permission.

cupressinum), which provides 80 per cent of indigenous timber output is an excellent constructional and furniture timber. Matai (Podocarpus spicatus) is the flooring timber par excellence and is also used for weather-boarding. Kahikatea (Podocarpus dacrydioides), an inodorous timber, was extensively used for butter

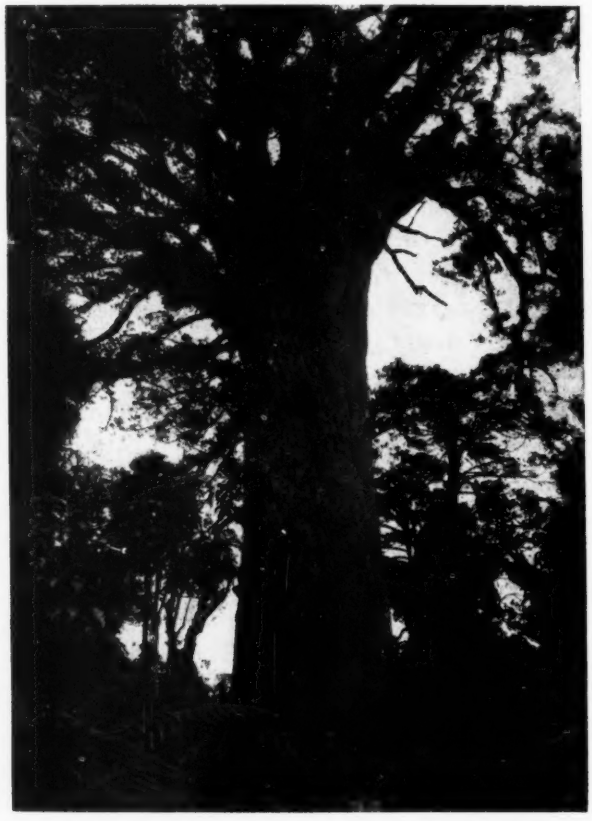

FIG. 2. The Kauri, largest and finest timber tree of New Zealand's indigenous forest, but now only milled in small quantities. This tree was rapidly exploited in the early days of settlement.

boxes and cheese crates, but is now being supplanted in this use by exotic timbers. Beech, totara (Podocarpus totara and P. hallii) and kauri (Agathis australis) are also milled in small quantities, there probably being no more generally useful softwood in the world than kauri (Fig. 2). During 1950 the total output of indigenous saw timber was approximately 320 million board feet.

Today, of the remaining 9 million acres of indigenous forest,

80 per cent is over mature and there is no net growth. The forests are in a state of retrogression towards a poorer timber forest. The conversion of over mature forests into healthy growing stands producing timber to the maximum capacity of the forest soil necessitates an extremely long period of silvicultural management. The

Fig. 3. Logging operations in New Zealand's forests are highly mechanized. In the above photo a log is being extracted from indigenous forest by a logging arch and tractor.

indigenous forest is not generally amenable to silvicultural management but there is now underway a practicable system of beech forest management which will ensure their perpetuation as a source of timber supplies.

Current timber demands, especially post-war housing construction, are depleting the virgin indigenous forests at such a rate—over 30,000 acres annually—that, without other provision being made, an adequate supply of timber would not be available during the whole of the intervening period (Fig. 3).

FIG. 4. A man-made forest on the Central Volcanic Plateau, North Island, New Zealand. The great expanse of light-colored trees are European Larch, while the dark patches are either Monterey Pine or Western Yellow Pine. (An exception is the grove of trees in the lower right hand corner.) In the center of the photo is the Waipa State Forestry mill.

Establishment of Exotic Forests

The establishment of exotic forests to supplement the indigenous forest resources is therefore of great importance and large forests of exotic trees have accordingly been established during recent years. The transfer of cutting from indigenous to exotic forests is being given increasing emphasis. The important part which exotic forests will ultimately play in the forest economy of the country is fully apparent. Experience in other countries where forestry has been practiced over a period of several centuries indicates, however, that exotic species have definite limitations. The national policy must therefore envisage the management of the indigenous forests to secure their maximum possible production of timber.

Full realization of the impending dearth of indigenous softwoods did not occur until the third decade of the present century. State afforestation, on otherwise unproductive land, was started on an organized basis in 1896, but it was not until the present State Forest Service was established in 1920 that planting by the State and commercial concerns began on a large scale. The broad aim of this afforestation scheme was the planting, cultivation and cropping of exotic timber on a perpetual yield basis. Planting began rapidly with the seed then most readily available—Monterey pine of the Pacific coast of the United States. The chief species used besides the Monterey pine were European Larch (Larix decidua), Western Yellow pine, Corsican pine (Pinus laricio), and Austrian pine.

The areas of otherwise nonproductive land that were utilized for afforestation were located in both the North and the South Islands of New Zealand. The most extensive planting took place on the high lying Central Volcanic Plateau of North Island (Fig. 4). Apart from the rugged mountain ranges this plateau comprises the largest extent of unproductive land in the country. The Volcanic Plateau is a vast ignimbrite sheet overlain by great depths of volcanic ash (Figs. 5 and 6). Fern and scrub provide the natural cover of the region. Other large forests have been established on infertile sandy and gravelly soils in Nelson, North Canterbury, Otago and Southland. There are at present forty state exotic forests, as well as several large and many small private forests, the latter often being in the form of shelter belts.

The exceptional and unexpected liberality of all New Zealand

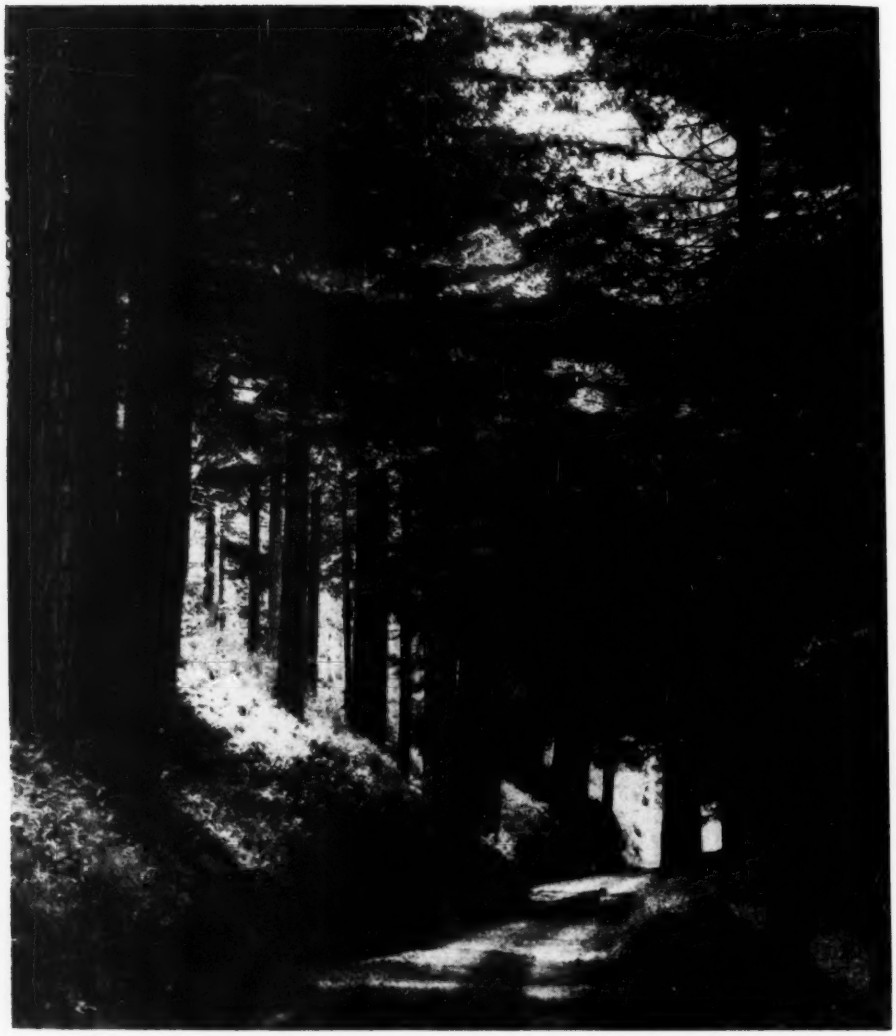

FIG. 5. California redwoods, only 35 years of age, growing in volcanic ash soils, North Island, New Zealand.

administrations for forestry developments proved an irresistible temptation to over expand the planting of exotic trees. The adverse effects have been many: silvicultural treatment at appropriate times has often been difficult or impossible, the percentage of imperfect timber has thus been too high and there has been over the last twenty years too much mature and over-mature timber for use. The present scheme for the development of a large pulp and

paper project on the outskirts of the largest of the exotic forests, Kaingaroa, gains stimulus from the fact that extensive areas of mature or over-mature timber must be utilized soon or they will be wasted.

One of the outstanding characteristics of the management of the exotic forests has been the rapid growth of nearly all the

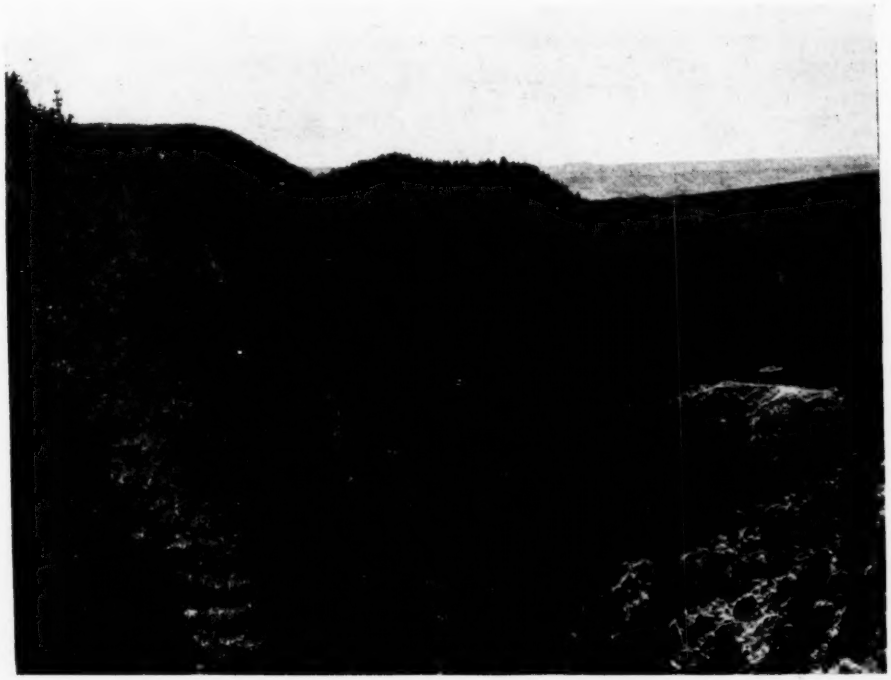

Fig. 6. Poor volcanic ash soils, useless for large scale agriculture, are here shown growing fine forests of Monterey and Western Yellow Pine, North Island, New Zealand.

species planted. Monterey pine, plantings of which make up about 50 per cent of the total area planted, grows extremely rapidly (Fig. 7). At 20 years of age some stands reach a height of 100 feet and an average diameter at breast height of 13 inches, yielding 7,000 cubic feet an acre. Maturity for marketing is therefore reached by this species at a very early age. Financial returns and the freeing of capital are correspondingly early. Other exotic trees in widespread use also grow more rapidly than in their native habitats. These trees include the Douglas fir, Western Yellow pine, Corsican pine, Lodge-pole pine, European larch, and Western red cedar.

A further significant feature of the management of state forests is their logging by the state and the sale of logs in place of trees. By this means and the inauguration of block sales in place of "royalty payments off the saw," there has been effected a marked reduction in forest wastage.

Various types of labor have been used since the inauguration of the afforestation scheme—prisoners, relief workers, and re-

FIG. 7. Logging operations within a forest of Monterey Pine, Kaingaroa, Volcanic Plateau, North Island, New Zealand.

cently arrived immigrant labor. Increasing numbers of immigrants have arrived, mainly under government sponsorship from the British Isles, Central Europe, and the Baltic States, since the war to relieve the shortage in this rapidly expanding enterprise.

The light weight, the easy seasoning and easy working properties of the exotic timbers tend to enable them to replace the chief indigenous timber Rimu, to a very large extent. They are widely used for practically all classes of framing and light construction, boxing and crating. In addition to use as saw timber, the exotic forests are being managed to yield a wide range of raw materials for other uses. Firewood, posts and poles, peeler-logs for plywood,

wood-wool bolts, and pulp wood for the manufacture of pulp and paper products can all be supplied. The exotic pine timbers today rank second amongst saw timbers in New Zealand, the annual cut having increased from 4 million board feet in 1918 to 150 million board feet in 1950.

Development of a Pulp and Paper Industry

Of considerable interest and importance is the establishment of an integrated saw mill and pulp and paper plant at Murupara on the Rangitaiki river. This will become the major source of supply of saw timber and pulp and paper products for the export trade. A railway is to be constructed to a new port at the mouth of the Rangitaiki river. The construction of a new township at the site of the plant is already underway.

The raw material is to be supplied from the 300,000 acre Kaingaroa State Forest, the annual potential sustained yield being 32 million cubic feet. The forest resources are unique in that there is a diversity of species so that in the event of any one species being irretrievably damaged by insect or fungal attacks, alternative sources of supply will be available.

Integration of a large scale sawmill and pulp and paper plant is the foundation of the Murupara scheme. It provides for common wood yard, steam and power plant and all engineering services for a combined sawmill, groundwood pulp mill, sulphate pulp mill, and newsprint and printing paper mill. When in full production, the plant will produce over 70 million board feet of timber annually, 100,000 tons of newsprint, 10,000 tons of other printings, and 15,000 tons of pulp. Sixty million board feet of timber will be exported annually, as well as 60,000 tons of newsprint and 15,000 tons of pulp.

Of no little importance is the fact that this export will reduce the adverse trade balance with Australia by about 40 per cent. Most important, tho, the project will save the sterling area (Australia and New Zealand) at least 16 million dollars annually. This sum can be converted into motorcars and the other innumerable goods which the people want from North America and cannot now obtain because this same sum is spent on newsprint and timber from Canada and the United States.

A prototype of the Murupara plant at Waipa, near Rotorua, created both to develop operating technique efficiency and to test

Australian markets, has been remarkably successful. Waipa saw timber has set a new high standard on the Australian markets. A long series of laboratory pilot plants and full mill scale tests has established the suitability of New Zealand-grown Monterey pine for the production of acceptable grades of several types of paper. Large scale mill trials were run at the only mill in the world then successfully manufacturing newsprint wholly from pine pulpwood, the Southland Paper Mills Ltd. of Lufkin, Texas. Pine pulpwood produces an accumulation of resin on the paper machine wire and prevents the production of a smooth sheet. The Lufkin trials were accordingly shaped to test the practicability of controlling resin accumulation in New Zealand grown Monterey pine. The test was successful, and it was also discovered that the New Zealand sheet was twice as strong as the best Canadian sheet of similar composition. A printing test by the Lufkin *Daily News* demonstrated that the sheet could be regarded as equally good as either Canadian or Scandinavian newsprint.

CONCLUSION

If New Zealand has the high courage to persevere with this venture now—for if not now it will be never—it will be indeed a remarkable achievement for so new a country, and an amazing climax to an afforestation scheme initiated only thirty years ago. The Forest Service of New Zealand hopes that the same type of enterprise which gave New Zealand the largest cooperative dairy company in the world, will likewise give it the largest integrated sawmill and pulp and paper company in the Southern Hemisphere.

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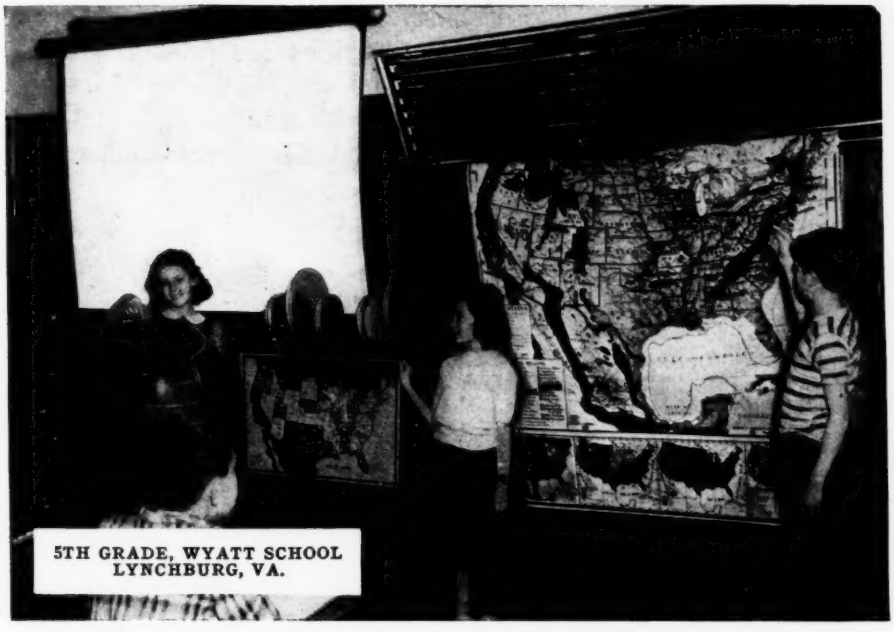

SPECIFICATIONS OF VISUAL MATERIALS IN A FIFTH GRADE

Charlotte Lawson
Teacher, John Wyatt School, Lynchburg, Virginia

Elizabeth Clark
Director, Bureau Teaching Materials, Lynchburg, Virginia

General specifications for visual materials in a fifth grade are true for other grades also. The following are the characteristics of the materials used:

1. Should be within the range of the pupils' understanding.
2. Should add to and clarify the textbook story.
3. Should lead to helpful discussions by the pupils.
4. Should be varied.
5. Should lead on to further study, investigation, and research.

To give specifications for any grade, it is necessary to know the subject area under discussion. In this case, the subject area in the fifth grade is Social Studies; the texts used are Rand-McNally's *Geography of the Americas;* Scribner's *Building Our America,* and current topics as found in *Weekly Reader* and other papers. The

unit under consideration is "Early Builders of America" taken directly from the history, supplemented by the following topics from the geography: "Exploring America" (pp. 3-37); "Living in the East" (pp. 37-99); "Living in the South" (pp. 99-144). Further assistance to the pupils is available in visual aids as listed below.

VISUAL AIDS MATERIAL USED

I. Globes
   12" Simplified Physical-Political
   22" Graphic Project[1]
II. Maps
   World, Physical-Political
   U. S. and World Blackboard Outline
   Virginia
   U. S. Regional-Political, with four supplementary maps showing:
      Relief
      Rainfall
      Distribution of People
      Agricultural Regions
   Eight Selected American History Maps
      SG4 The Age of Discovery
      SG5 Spanish and French Explorers
      SG6 European Beginnings in America, 1654
      SG7 Early Colonies
      SG8 Division of North America Among the Nations
      SG8a Colonial Products and Commerce
      SG10 The Movement Westward
      SG15 The Expansion of the American Nation, 1783-1860

   Note: These wall maps are supplemented by those which the children make. In addition to their own sand relief maps, they also use the desk outline maps on which to plot routes of discovery, exploration, and colonization, distribution of crops, rainfall and physical patterns.
III. Teaching Films, Filmstrips, and Slides
IV. Stereographs
V. Charts and Graphs (suggested and made by pupils)
VI. Flat Pictures (These the pupils can collect from many sources)
VII. Pupil Projects:
   A. Friezes
      1. Depicting colonial life
   B. Construction Work
      1. Early colonial home
      2. Home furnishing
      3. Stockade
      4. Hogheads of tobacco
      5. Transportation
      6. Communication
   C. Booklets—class or individual
      1. Colonial Williamsburg

[1] This globe circulates among all rooms. The other material is permanent home room equipment.

2. Beginning of Revolution
3. Part played by Massachusetts
4. Virginia's part in the Revolution

D. Scrapbooks—class or individual
E. Posters
F. Fieldtrips
G. Creative drawings
H. Panel discussions
I. Reports
J. Culminating Activity
1. Display of all materials made and collected during study of unit
2. Dramatization
3. Examination

VIII. Radio (The Lynchburg schools were fortunate this year in having the Junior League sponsor a series of radio broadcasts on the folk songs that became popular with the various stages of growth and westward movement in our nation)

IX. Recordings (Recordings of songs and music associated with the history of this period are played frequently in the classroom for study and enjoyment)

Suggested Visual Aids for Two Fifth Grade Units

During the fifth grade a history unit entitled "Early Builders of America" is correlated with a unit of geography covering approximately the same area of the United States. The following outline indicates the teaching aids available in our library for the various phases of history and geography. The symbols used are: 1. M motion picture; 2. FS filmstrip; 3. S slides; and 4. R recordings. Two precautions might be mentioned in passing, namely, always prepare pupils for presentation of the material to be studied and follow showings and records with discussion and repetition if necessary.

I. Early Builders of America (history)
A. London Company Starts Virginia Colony
M Captain John Smith and Pocahontas
M Early Settlers of New England
FS The English Settlement and Colonial Conflict
FS Jamestown and Captain John Smith
FS Powhatan's Tomboy
FS Indians of the Eastern Woodlands
FS Early Indians
B. Virginia Gets Some Neighbors
M Life in Old Louisiana
M Kentucky Pioneers
M Pioneer Homes
M Old South
FS Historic North Carolina
FS Old South
C. Southern Colonists Lived on Plantations
M Planter of Colonial Virginia

M Colonial Williamsburg
M Historic Virginia
M George Washington's Virginia
M Eighteenth Century Life in Williamsburg
M Old South
M Life in Old Louisiana
M Colonial Expansion
M Our State Capital
M New Fields in the Old Dominion
M Virginia—the Old Dominion
FS Mount Vernon
FS Life in the Colonies
FS Colonial Virginia
FS Historic Virginia
FS Old South
FS Steamboat 'Round the Bend
S Williamsburg, Virginia

D. Pilgrims and Puritans Settle New England
M Early Settlers of New England
M New England
M Colonial Children
M Colonial Expansion
FS Pilgrim Fathers (A)
FS Pilgrim Fathers (B)
FS The Pilgrims and Puritan Life
FS Plymouth Girl

E. Many Peoples Settle Middle Colonies
FS Old New York
FS Dutch in New York
FS Patroon's Gift—Dutch
FS Thanksgiving
FS Early Dutch Settlement in New York
FS Penn's Woods
FS William Penn

II. Geography of Eastern United States (geography)
A. Exploring America
M Story of Christopher Columbus
M Discovery and Exploration
M Colonial Expansion
M Maps are Fun
M Let's Look at Maps
M Seasons
M Earth, Rotation, and Revolution
M Forest Ranger
M Pioneers of the Plains
M Early Settlers of New England
M Kentucky Pioneers
M Cattleman
FS Christopher Columbus
FS Discovery and Exploration
FS Columbus Day

FS Early Navigators
FS Voyage and Discovery
FS How Our Country was Discovered
FS Spanish Discovery
FS Climate
FS Rotation, Revolution, and Consequences No. 1
FS Cortez Conquers Mexico
FS English Sea Dogs
FS Sir Francis Drake
FS Founders of New France

B. Living in the East
M Captain John Smith
M Early Settlers of New England
M Colonial Children
M New England
M New England Fishermen
M New England Fisheries (Cod)
M Northeastern States
M Maine, this Land of Ours
M Nation's Capital
M Washington, the Capital City
M Washington D.C., This Land of Ours
M Inside the Capitol
M Inside the White House
M Wool
M Dairy Farmer
M Milk
M Let's Look at Maps
M New Fields in the Old Dominion
M Chesapeake Bay
M Washington, Shrine of American Patriotism
FS Cortez Conquers Mexico
FS Founders of New France
FS English Sea Dogs
FS Sir Francis Drake
FS Captain John Smith and Pocahontas
FS Plymouth Girl
FS Pilgrims and Puritan Life
FS Early Dutch Settlement in New York
FS Patroon's Gift
FS Little Old New York
FS New York—Harbor
FS Old New York
FS Boston
FS Book Manufacturing
FS Philadelphia
FS Visit to Washington
FS Northeastern States
FS Colonial Children
FS New England Industries
FS Making Shoes

FS Cotton
FS Marble Production—Vermont
FS Coal to Electricity
FS Niagara Falls
FS Coal Mining
FS Coal from the Ground Up
FS Atlantic Coastal Plain, Parts I & II
FS Appalachian Mountains and Valleys, Parts I & II
FS Piedmont Plateau, Parts I & II

C. Living in the South
M Captain John Smith
M Southeastern States
M Planter of Colonial Virginia
M New Fields in the Old Dominion
M Our State Capital
M Virginia—the old Dominion
M Historic Virginia
M Colonial Virginia
M George Washington's Virginia
M Strength of the Hills
M Forest Ranger
M Story of Dr. Carver
M King Cotton
M Cotton Growing
M Life in Old Louisiana
M Old South
M New South
M River
M Truck Farmer
M Orange Grower
M Irrigation
M Cattlemen
FS Captain John Smith and Pocahontas
FS Powhatan's Tomboy
FS Southeastern States
FS Historic Virginia
FS Colonial Virginia
FS New Orleans
FS Old South
FS New South
FS North Carolina—P & O
FS Soap Making
FS Upper Mississippi
FS Sugar Cane
FS Irrigation
FS Cotton
FS New Mexico
FS Oil Hunters
S Williamsburg
S Surrender Grounds at Appomattox
S Tangier Island off Eastern Shore, Va. and Wild Ponies on Chinqueteague Island

Our Visual and Audio Aids Library

The Lynchburg, Virginia Bureau of Teaching Materials is six years old.

We feel that our teachers have done a wonderful job of utilizing effectively the maps, globes, charts, and flat pictures with the radio, teaching films, filmstrips, slides, and other teaching materials.

In each classroom is found as standard equipment, a globe, regional-political maps, charts, outline maps, wall screen for projected materials, and many classrooms have turn-tables and radios.

In the Teaching Materials Center are 479 motion pictures, 785 filmstrips, and 35 slide sets, a supply of maps, and globes to supplement needs of teachers.

There is a 45″ ×60″ wall screen in most classrooms in the elementary schools, a motion picture projector on each floor of a building, mounted on a strong metal projector table with soft rubber casters.

Many schools have been equipped with black shades or drapes to darken classrooms for projected materials.

The films, filmstrips, slides, and recordings are requisitioned by teachers each week thru the Bureau of Teaching Materials representative in each building. These materials are delivered to the schools on **Monday morning** by truck and picked up on Friday mornings, returned to the B.T.M. Center where they are inspected and made ready to go out again the following week.

The Role of Audio-Visual Aids in the Curriculum

Lynchburg has, according to statistics from other places, a large and effective number of various audio-visual aids which are constantly used by the teachers. We feel that these teaching materials play an important role in our instructional program.

For example, an integration of many visual aids is seen in a visit to a fifth grade room studying Norway. A music appreciation broadcast was scheduled. The radio program was based on the life and works of Edward Grieg, Norwegian composer, part of a series, "Piano Adventures," carried over WWOD Monday mornings under sponsorship of Lynchburg Junior League. The broadcasts lasted only fifteen minutes, but was used by the teacher as the base for an hour's lesson on Norway's geography, history, customs, and folk music which Grieg wove into his compositions.

In preparation for the program the pupils located Norway on

a map and a globe and noted its climate conditions. There was discussion of the occupations of the people and the effect of a rocky soil and isolation by mountains on the way of life. Emphasized was the development of folk music as a diversion and entertainment.

A teaching film was shown on Norway entitled "Norway Farmer-Fisherman," which depicted life in the country and its famous landmarks. The film was tied in with the broadcast by a scene of the statue of Grieg, accompanied by commentary on his work.

Music practice for the day featured singing in the harmonic style which Grieg employed. There was explanation of his use of the flute, oboe, and bassoon. Vocabulary drill included such words as Viking, fjord, Scandinavia, and Oslo.

Tho radio is not a form of amusement in the classroom, the pupils do enjoy the broadcast, and the enjoyment is heightened by a briefing on what is to come and the relating of the program to other studies.

THE GEOGRAPHER'S ROLE IN EDUCATIONAL LAND USE

PAUL VOURAS
The Massanutten Academy, Woodstock, Virginia

Education is now in a phase of rapid and unprecedented development. The conditions under which it develops are changing dynamically and with an ever-increasing rapidity; such conditions must result in far-reaching changes in the use of land. With these new educational developments comes the geographer to investigate and aid in the planning of the better allocation of land for schools.

By way of this comparatively new field, the geographer, with his specially acquired knowledge, can now give immeasurable aid to communities in the selection of new school sites and he can advise as to proper means of obtaining a higher efficiency from present land use.

Educational land use, like manufactural land use, constitutes an intensive use of land. Philbrick writes:

"By reasons of the small land involved in proportion to the relatively large share of the tax dollar invested and the large proportion of the population directly participating, educational land use is one of the most intensive uses of land in a community. It

would seem, accordingly, that from such land use, the people of any community reasonably may expect to get results which are of very great value to individuals and to society as a whole, and that they should welcome any light that can be shed on the actual nature and functioning of education in that community."[1]

It is here that the geographer with his mapping techniques can be of untold assistance. The geographer can help the educators solve their particular problems of land use by applying to these problems the techniques he uses in solving other land use problems.

The geographer, in studying the details of agricultural, recreational, and numerous other forms of land use, has arrived at conclusions concerning areal differentiations in such uses of land and has discovered ways in which these types of occupance are integral components of the dynamic and ever-developing man-land associations found in the areas in question. After his study of a community's educational problems, the geographer presents his findings in a clear and concise manner. The geographer can utilize many means for the presentation of his findings, but his most useful and distinctive tool is the *map*. A self-explanatory map presents to the educational planning committee a complete and accurate picture, easily grasped and far clearer than statistical tables containing similar amounts of factual data.

Types of Maps

Now for a more detailed explanation of the mapping of educational land use and the great value of these maps as a guide and means of visualizing the role of geography in the analysis of such use. There is no uniform number of maps required to show clearly and to depict the specific school location problems of a given community. To demonstrate fully the many and various uses to which maps can be put, however, several examples are briefly explained in the following outline.

Group A

Type 1. A zone map of the city, town or village. This map would show the location and distribution of industrial business, recreational and residential areas. A zone map would be helpful

[1] Philbrick, A., *The Geography of Education in the Winnetka and Bridgeport Communities of Metropolitan Chicago,* Ph.D. dissertation, U. of Chicago, 1949. p. 11.

in determining the economic value and the location efficiency of present schools and sites.

Type 2. A construction map of new homes and housing developments. Here you would have a map indicating something of the extent and direction of city growth, as well as, a basis upon which to estimate the location of the future school population and the subsequent location of any new school buildings.

Type 3. A map of undeveloped or vacant land. This map would serve to give a long range view of possible future land development and the growth of new residential areas.

Group B

Type 4. A map showing the dominant relief features of the city area. Such a map would be helpful in planning for new school sites, since elevations and slopes would be shown. This would be of particular importance for cities situated in rough and hilly terrain.

Type 5. A geological map showing formation of the area which is encompassed by the city limits. The necessity of such a map is quite apparent in view of the fact that certain types of subsoil and underlying rock form more substantial foundations for construction and for playing fields than other types.

Group C

Type 6. A map showing births by school districts. This informative map would reveal to school planning authorities the approximate distribution of future school enrollment in the respective school districts. It would guide school officials in locating new school buildings or increasing the classroom space in the existing buildings.

Type 7. A map showing the distribution of the present school population. The primary purpose of such a map would be to depict the required carrying capacity of each school building.

Group D

Type 8. A map showing all existing thorofares and streets. The importance of this map would rest on its helpfulness in locating new school buildings on sites removed from heavily traveled traffic arteries, but accessible to the children.

Type 9. A map showing all proposed highways and street plans.

Such a map would also be helpful in locating new school buildings where the children would not be endangered by heavy traffic. Types 8 and 9 might possibly be combined into one map, depending on a city's individual requirements.

Type 10. A map showing existing transportation facilities. A map of this type would naturally be of great help when planning and allocating the routes of contracted school buses for the free school transportation service. It would also aid in the planning of new school locations, by showing sites which are located within any given distance from existing schools.

Group E (Miscellaneous)

Type 11. A map showing the location of schools and the respective areas they serve. Such a map would reveal not only the effective school area of each school, but also the possible need for rearrangement of the school districts, thus reducing the overlapping of school areas.

Type 12. A map showing the location of school buildings, playgrounds and the additional recreational areas of both public and parochial schools, and of public parks and recreation areas. The last map would enable the city planning commission to co-ordinate school playgrounds and all recreational areas with the various activities of the school, thus making possible a more satisfactory use of the existing facilities.

Maps Form a Basis

The foregoing twelve examples of educational land use maps serve to give the school planning committee a basis for solving its land use problems. The number of maps required will depend on the size of the community and the extent of its particular land use problems. It is difficult, if not impossible, to think of land use problems the study of which does not require the use of maps. The map is a guide. This new use of maps has brought into prominence the role of the geographer.

Maps, obviously, are only one of the tools which the geographer uses in presenting and depicting to the school planning committee aspects of its land problems. Other tools such as graphs, charts, tables and statistics should be used to facilitate the study of these and other aspects of their problems.

The geographer has always been cognizant of the fact that he

must have a broad interest and specific training in many aspects of the geographic complex if he is to be able to give useful help and advice. Therefore, he is interested not only in the physical features of a city—relief, drainage, and geological base—but also in its cultural features. Because they constitute a significant component of the regional complex, he knows that cultural features such as houses, institutions, roads, and commercial establishments must not be overlooked or ignored. Even unoccupied places assume significance; for they may play a role in the decline or growth of a city.

Thus, we see that a broad interest in human affairs and specific training in various fields are assurances that the geographer can and should make worthy contributions to the solution of educational land use problems.

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LEARNING THRU INTERNATIONAL CORRESPONDENCE

ROBERT E. CRAMER
Library of Congress

Learning about the people and nations of the world can be encouraged thru the friendly exchange of letters with citizens of other nations. The people of India are very much alive and real to a boy in Chicago who is corresponding with a boy in Bombay. The spirit of tolerance and fellowship grows rapidly under such personal contacts, and becomes deeply embedded in the basic philosophy of the maturing correspondents.

I have enjoyed a lively international correspondence for the past fifteen years, and today I am still exchanging letters, some of which are with my first international friends. Having begun corresponding as a hobby early in high school, the height of my activity was reached when I was a high school senior. At that time

I was writing to fifty-five boys and girls of my age, in forty separate countries. During the period of corresponding, I have received over 500 letters, hundreds of snapshots, postcards, newspapers, souvenirs, scrapbooks, and many gifts. International corresponding has been a continuous source of growing knowledge, in addition to a lot of fun.

MY FRIENDS ABROAD

I have made many world friends thru the years. My hobby stimulated early in life a deep personal interest in, and gradually a better understanding of the people and nations in the world. To me, Sarawak has never been simply another name on the map, but it is the home of a Chinese friend, Charles. Altho we have never met, many letters and gifts have passed between us during the years, and we both feel that we know each other well.

I have been corresponding with Hans of Austria for fourteen years. When we initiated our correspondence, Hans was a baker's son attending school, and looking forward to the days when he could ride his bicycle into the country around Vienna. Hans is now married, has a family, and has taken over his father's bakery. Our letters today are attempts to interpret world political activities, and comments on our own families. One cannot help feeling akin to these friends as they relate their daily activities and thoughts over a period of many years.

I think of South Africa as described in letters received from a Dutch boy living on his father's farm in the Little Karroo. While in high school I knew of the dryness in the Little Karroo of South Africa, and remember how I rejoiced with Piet when he wrote, "We now have much rain to water our crops. The Gamka River is in flood, and it is a beautiful sight to see the yellow water fall over the rocks. We have no bridges across the Gamka, because the river is usually dry, and we could always walk across."

Andre of France wrote often, before World War II, about his bicycle trips across France, and into the Low Countries. Recently he flew to Karachi, Pakistan, on his honeymoon. The photographs he took from the window of the airplane, the scenes of India, together with a five-page letter, is a miniature travelogue.

Before World War II, I followed a German friend from a quiet life in southern Germany, where he was finishing school, and preparing to teach, to a labor-service camp. It was interesting that his

work was building dikes to reclaim the lowland for farming, and he wrote with surprise, "So we win land without war." I watched with dismay as his letters changed from interesting descriptions of his activities and surroundings, to fanatical accounts of the New Germany. I was showered with Nazi flags, pictures of Hitler, and propaganda booklets. Included in my last letter from him was his picture in the uniform of the "Wehrmacht."

One of my most interesting foreign friends of long acquaintance is Adolph of Latvia, who lived on a farm near Riga for many years. Ambitious and full of dreams, Adolph enrolled in college to study art, but within a few months he was drafted into the German Army, when the Germans overran Latvia. Subsequently my friend was captured by the Russians. Later he escaped and became a displaced person in western Germany. In England today, Adolph is a European Volunteer Worker, and is wandering desolately from job to job, hoping some day to return to his home in the Baltic. A sense of humor and a determination to live have enabled Adolph to write, without bitterness, long and interesting accounts of his many activities and his continually changing environment.

An analysis of several hundreds of my letters has revealed what can be expected during a friendly exchange of letters. Approximately one-half of my friends were boys. Almost all were of my age, and with only two exceptions all wrote in English. I have found that girls tend to write longer letters, and more frequently than boys, but stop corresponding when they marry, or after four or five years. The boys, on the other hand, tend to continue corresponding after marriage. I do not believe it is possible to state which sex writes the more interesting letter, as this varies with individuals. The average number of letters I received per correspondent is eight. Often the letters are difficult to read because of poor handwriting, or grammar, and only a few are ever typewritten.

Schools

Most of my correspondents were attending school when the first letters were written, and we have had many lively discussions of our respective school systems. Most European and European-influenced schools require a greater number of courses than American, and the foreign scholars felt the lot of the American school

boy was very easy. A Norwegian, complaining about the strong emphasis on languages in the Norwegian school, reflected wisely, "People of smaller states always have to learn the languages of the greater nations with which they communicate."

It was interesting and informative to follow these friends as they were graduated from school, and began paid employment, or entered college. Many had college experiences similar to, and concurrent with mine. Two of my friends came to this country after World War II for graduate study, and we have had the mutual pleasure of becoming personally acquainted. A friend from Iraq is studying at a university in the East, completing requirements for his Ph.D. degree in education. My Hindu friend from Bombay has completed his Ph.D. degree in agriculture at a Mid-Western university, and has returned to his native country to serve his government.

Local Environment

The local environment of foreign friends can be visualized and understood from answers to direct questions, or more commonly from statements made in the course of friendly "conversation."

A Cape Town girl wrote of the cool breezes from the Atlantic Ocean tempering the heat of Africa, and the waters of the cool Atlantic meeting the warmer Indian Ocean, and the resultant fogs. "Because of that our beaches are on the warmer eastern side of Cape Town, and not on the cooler western side."

My southern hemisphere friends, and those living near the Equator write about the hot Christmas, and the universal wish there for a snowy Christmas. One never forgets that the southern hemisphere has different seasons from ours, when the correspondents enjoy camping, fishing, and swimming during their Christmas vacation. A Tasmanian wrote about her sunburn, and the annoying sandflies as she relaxed at the beach on Christmas day. A South African friend described Christmas Day as "scorching hot," but "in spite of the great heat we ate the traditional turkey and Christmas pudding."

A Finnish girl suggested I examine the map she enclosed, as she wrote briefly on her country. I have never forgotten this statement from that letter, "Did you know that in summer the sun does not set at night in the northern part of Finland, but shines one to two months constantly? In southern Finland, however, the sun sets

every night." Those statements meant much more to me than similar impersonal statements in a textbook.

I remarked about the small community in which the Estonian girl lived; she stated defensively, "You think our cities are small, but they are big enough for us. We in Estonia prefer small communities." A boy in Dundee, Scotland, described the big docks, and the many jute factories where he worked. "Big ships from Calcutta unload the jute here, and we haul it to the factories in trucks." He then described the processing in the factory.

A girl from Iceland described her home of 4,000 people as "the most beautiful town in Iceland. Surrounded by mountains, the town is spotted with beautiful gardens."

More Than Letters

A correspondence may have interests in addition to letters, such as exchange of gifts, postcards, newspapers, photographs, coins, stamps, flags, and school bulletins.

Gifts are interesting to send and receive. I have Javanese puppets, a monkey skin from the Gold Coast, scrap books from friends in several countries, seeds from a Ceylon flower garden, a replica of an Egyptian mummy case, a six by nine foot goat hair rug from Iraq, wooden shoes from Holland, pressed flower blossoms from Belgium, flags, small dolls dressed in native costumes, original paintings, many publications, calendars with photographs of local landscape, and many more.

A girl in Czechoslovakia spoke about singing with a group at school. I sent her a booklet of American melodies, and she wrote on blue paper with red ink, "I tried all the songs, and I like them very much. I found among them many melodies which I knew already, and I was very happy to learn them in English too."

A friend in Sumatra wanted pictures of Alice Faye. I expressed interest in the crocodiles he wrote inhabited the creeks near his home, and in exchange for several framed pictures of his favorite actress I was sent five stuffed baby crocodiles.

I have received maps of most countries where I have friends, and often detailed maps of their cities. One friend, while traveling thru several countries of Europe, sent me maps and pictures of every major city in which he stopped. Recently I received a fifteen-page atlas of Norway, an excellent cartographic job. Written in Norwegian, the legends were translated for me by my friend.

International Corresponding as a Hobby

The exchange of letters with foreign friends is interesting, and educational, and definitely stimulates learning and better understanding of the people of the world.

There are several suggestions that may be passed on to those wishing to correspond with international friends. The most important is always to type your letter. My friend from Iraq told me recently that when I first wrote to him he received fifty letters from other Americans about the same time. My letter was the only one he answered, because he could not read the other ones. They were not typed.

Be an interesting writer, as well as a good "listener." Never use slang, contractions, or abbreviations without explaining them. Answer letters promptly if the friendship is to survive. Ask questions you would like him to answer and discuss, but do not make the questions involved. For example, "Tell me about your country" is too involved. A specific question about a specific situation, such as "Tell me about the street you live on," or "What subjects do you study in school?", would be more likely to prompt an interesting and informative reply. If a little time is taken to read about the country of the friend, more carefully chosen questions can be selected. Some of my friends were pleasantly surprised when I located their small town on a map, and asked them about a nearby river, mountain, or town. Encourage the friend to ask questions about you, your activities, and your country.

Writers living in foreign countries inevitably think of America as you describe it, and the American people as typified by yourself. The American writer in turn soon thinks of nations in the world as described in the letters he receives, and the people in those nations as millions of Beths, Adolphs, Charles, and Andres. No textbook can make facts so interesting and so personal as those found in letters.

International corresponding with friends is fascinating, educational, and fun. The exchange of letters should not be confined exclusively to the high school foreign language class, since it is just as valuable for students in all levels of high school and college, as well as for the non-student, old or young. Ambassadors of goodwill are desperately needed in the universal struggle for good international relations.

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OCEANOGRAPHY IN GENERAL EDUCATION

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University of Hawaii

Geography has long recognized the oceans as gross features of the earth. Yet the oceans are so familiar that their complexity dawns upon us only when we try to solve the problems of their life and movement. This seems the most difficult of all the resource studies. Geography, zoology, botany, algology, bacteriology, chemistry, physics, geology, mathematics and astronomy in profound interrelation must be brought to the task of understanding the dynamic system of the seas, a science only well begun. The scope of the problem is partially evident from the immensity of the areas covered by the oceans, some three-fourths of the entire globe, constituting an area available for life more than three hundred times as great as that on all land areas. The complexity of the problems is illustrated by the subtle responses of oceanic life to the conditions and changes in the chemistry, temperature, fertility and movement of the seas, varying with depth, latitude, winds, and the distribution of land masses.

Importance of Oceanography for the Schools

For many island or coastal communities the sea meant food, travel, recreation, and some of the mystical qualities of life itself. This was true of the Hawaiian Islands in the days when the ocean was well integrated in the daily routine of living. In this day the ocean must become increasingly important economically to these islands and to the earth's population generally. Consequently it becomes an aspect of general education.

The development of oceanic fisheries depends directly upon the oceanographic investigations of various governmental agencies.

The restoration of inshore fisheries depends on the study of the life succession in the adjacent waters. The aspects of oceanographic study of direct or potential significance are numerous: 1. the effect on weather, 2. navigation, 3. possibilities of developing planktonic food resources, 4. development and conservation of world fisheries, 5. exploration of other new food supplies, 6. experimentation with heat engines utilizing thermal differential between the top and bottom waters, 7. utilization of water strata for sending relief signals, 8. geophysical research in the effects of volcanoes and earthquakes under the sea upon the safety of island and coastal communities, and 9. beach control. We may come yet to the seas in dead earnest looking for food for a world population which will apparently be doubled soon after the turn of the century. If the need existed now, we would not be ready with sufficient knowledge of the oceans.

This Great and Moving Sea

The ocean is constantly in motion, now slow as the creeping of the Mediterranean bottom waters down the coast of Africa to the Antarctic, now as swift as the Gulf Stream, a veritable river in the sea running as fast as three or four knots an hour. The ice cold waters of both the Arctic and Antarctic oceans move into the deeps and bottoms of all the oceans, traces reaching the opposite hemisphere. The Atlantic water passing into the South Atlantic off Africa comes from the Labrador Sea, the southeast coast of Greenland and from the straits of Gibraltar. South Atlantic water enters the Gulf Stream and moves north as part of the current that later washes the shores of northwest Europe. Some Indian Ocean water moves into the Pacific, and the high saline waters of the Red Sea can be traced to the southern limit of the Indian Ocean, possibly to the Antarctic. In the Southern Ocean there is a massive movement of water some three hundred to eight hundred feet deep called the West Wind Drift. Beneath this is a layer from the North Atlantic moving south and east. The intermediate water around the Hawaiian Islands is formed off the coast of Japan. This is only a glimpse of the amazing complexity of the horizontal movements of the seas. There are also turbulences, upwellings, vertical movements of the water arising from: 1. separation of currents in the sea or from their pulling away from continental shores, 2. from changes in surface density because of evaporation, and 3. from the

sinking of cold and heavy surface waters such as occurs all around the Antarctic continent. The equatorial and Humboldt currents are examples of currents with which major upwellings are associated. The Red Sea in winter is an example of changes in surface density because of evaporation.

These upwellings of the oceans are particularly interesting to island and coast dwellers as the upward movement of the water brings up fertilizer into the photic zone. This photic zone contains the depths where the sunlight reaches strongly enough for photosynthesis by the one-celled plants. In this zone the fertilizer can be utilized by plankton which in turn supports a rich fish population. These upwellings also markedly affect the climate of adjacent areas. Examples are found along the California coast and the west coast of South America where the pulling of the current away from land brings up masses of cold water from the depths.

In its composition and temperature the sea is also variable. Most of the oceans show a salinity between 34 and 37 grams per liter. Salinity is highest near the equator, lowest near the poles. Water areas such as the Baltic show less than 10 grams per liter, the Red Sea—where there is rapid evaporation—as much as 46.5 grams per liter. These differences in salinity give rise to both vertical and horizontal movements in the seas. Dissolved in the sea is not only common salt, its major constituent, but also ions and compounds of magnesium, sulfur, calcium, potassium, bromine, carbon and thirty-eight other elements, in addition to the dissolved gases like oxygen and nitrogen.

As to the life of the sea, the whole sea, from Antarctic ice to Arctic ice, from the enclosed bays and continental margins to mid-ocean, is a great meadow, broad and deep: This meadow blooms suddenly in northern waters with the return of the sun in March and April and dies down in October as the sunlight grows weak. In some places the meadow is lush, in others thin and weak. The grass of the sea, the microscopic one-celled plants, the phytoplankton, reach down as deep as light is strong enough for photosynthesis, 200 meters in the clear waters of the tropical ocean, less in the northern waters.

The plants of the sea carry on the same processes as those on land. With the aid of sunlight they combine water and carbon dioxide to form carbohydrates. Using other compounds from the ocean to meet their needs they build proteins, fats and other com-

pounds of life. Like other plants they need fertilizer, but in the sea, probably more commonly than on land, the growth of plant life is stunted by the lack of these fertilizer salts.

The drifting grazers, the small crustaceans, the copepods, ostracods and euphasids, feed on the microscopic plants. Preying on these are the small predators such as the arrow worms, the larger crustacea and others. These in turn are the food of still higher orders. This is the ocean's pyramid of life.

The fertilizer salts in the photic zone are quickly used up by the plants. The waters below this, two or three hundred meters down, are rich in fertilizers. It is only where deep waters rich in phosphates and nitrates well up to the surface that the plants flourish in greatest numbers. At these spots are also found the greatest number of grazers, the greatest number of predators and the greatest fisheries.

The remaining partially unexplored fisheries of the world, the western coast of South America, occur in areas of major upwelling of the ocean waters. One of the areas of upwelling of greatest interest to the Hawaiian Islands is the area between the equator and five degrees north caused by the counter equatorial current. Upwelling occurs around the Antarctic continent because of the sinking of heavy surface waters. It occurs along the coast of South America because of the pulling away from land of the Humboldt current—this being caused by the rotation of the earth itself. This is also true of the west coast of Africa.

This ocean environment in its infinite complexity and subtlety is a study essential for the modern student.

What Is Being Done Over the Earth?

It would be difficult to do justice to the efforts which have been expended already in every part of the world to solve the physical and biological puzzles of the oceans. From the journey of Pythias in the 4th century B.C. to Iceland and the Arctic ice pack to the modern trips of the "Atlantis," a ship with two laboratories, a sonic sounding machine and thirty thousand feet of dredging wire, there is a history of slow but accelerating accumulation of data on the broad front of oceanic problems.

In the United States, the Naval Hydrographic Office, the Coast and Geodetic Survey, the Fish and Wildlife Service, the Scripps Institution of Oceanography, the Woods Hole Oceanographic In-

stitution, and the Bingham Oceanographic Laboratory, to mention only a few of the organizations, are all concerned with same aspects of oceanographic research. The Pacific Oceanic Fisheries Investigation, a project of the Fish and Wildlife Service, started in the central Pacific in 1949, is engaged in an extensive investigation of the ocean currents and plankton distribution related to biological productivity, the distribution of commercial fish in the central Pacific and the development of new fisheries methods designed to meet the conditions of the open ocean and the habits of its fish, especially tuna. There have been many other investigations.

In Sweden, the Hydrographic Biological Commission; in Norway, the Geophysical Institute and the University Biological Station at Drobak; in Denmark, the Committee for Fisheries Investigations and the Study of the Sea and the Permanent International Council for the Study of the Sea; in England, the Marine Biological Association of the United Kingdom; in France, the Oceanographic Institute in Paris; in Monaco the Oceanographic Museum; in Italy, the Naples Zoological Station; in Russia, the All-Union Scientific Research Institution of Marine Fisheries and Oceanography, and the Polar Scientific Research Institute of Marine Fisheries and Oceanography; in Canada, the Biological Board; in North America, the North American Fisheries Council and the International Passamaquoddy Fisheries Commission; these are only a few of the research agencies that carry on this tremendous research task: the study and possible control of oceanic life.

Implications for Schools

Land-dwelling animals that we are, the sea has been a barrier to us, something to pass over in boats or fly over in airplanes, an unchastened element, mystic, unconquerable. Now we are in a position to study it, utilize its life and power, learn how to increase its life and in a puny fashion begin to experiment with the control of its biological resources. This seems to be a threshold to something profoundly fascinating, enormously exciting. Perhaps this feeling is one of the things the school can communicate to its pupils.

The study itself is much involved, but its major findings and its significance are for general education. As citizens we are going to approve or disapprove more assistance for oceanic investigations, and possibly as citizens we may look to the seas in some not

so distant generation for a major source of food supply. Beyond the practical use to which the oceans may be put, and the geopolitical considerations involving the oceans which figure larger and larger upon the international scene, there is still the basic curiosity of man to understand his environment and in understanding it to feel more secure with it.

Basic Generalizations for Schools

A list of basic generalizations has four purposes: 1. to act as a guide for the selection of experiences for the student; 2. to use in setting up the evaluation program of the school; 3. to help the teacher generalize her own knowledge and experiences with the problem; and 4. to furnish teachers with a convenient tool for looking over the broad implications of the resource pattern for schools. These are not to be taught directly, but they are the kind of generalization toward which, thru many different experiences at all school levels, the school hopes to move its students. The following is a partial list only:

1. The sea was probably the original environment of all life, plant and animal, and we find in its supporting and sustaining medium, life, both plant and animal, far more primitive and simple than that we find on land;

2. Most of the life in the oceans, the bulk of the species and the bulk of the weight of living material, is microscopic and near-microscopic drifting life, unobserved and unknown to even those who live by the sea;

3. The pyramid of life in the ocean is based upon the utilization of inorganic compounds by microscopic one-celled plants drifting in the sunlight zone; the large animals of the sea are not herbivores, as they are on land, but carnivores, because the plant life is almost entirely microscopic and cannot be caught directly by large animals;

4. There is no uniformity in distribution of marine organisms thruout the oceans either horizontally or bathymetrically; there is no depth of water without life;

5. The fixed algae along the shore contribute to the food of the sea only in a most minor way, the principal food production being carried on by microscopic one-celled algae drifting in the water;

6. The production of lush plant and fish life in the oceans is dependent on the restoration to the photic areas of fertilizers which

have sunk either into lower strata or to the sea bottoms;

7. Life in the oceans is delicately adjusted to conditions of temperature, movement of the waters, availability of certain kinds of food supply, sunlight and the presence of dissolved gases;

8. The area available for food production in the oceans is some three hundred times as large as the area available on land;

9. The oceans are constantly in motion, the direction and speed depending on winds, the earth's rotation, changes in density, changes in composition and changes in temperature;

10. The oceans form a single dynamic mechanism, world-wide in operation and in influence; and

11. The oceans distribute heat by means of the major oceanic currents from the tropics to the temperate zones.

Suggested Experiments

1. To discover the percentage of dissolved solids in ocean water by evaporating and weighing;

2. To test for the presence of chlorides by means of precipitation of silver chloride from silver nitrate solution;

3. To test for presence of carbonates by barium solutions;

4. To investigate thermal stratification of sea water by applying heat to the top layer only and measuring temperature at various depths;

5. To measure the density of sea water in various degrees of dilution by careful weighing.

6. To demonstrate the presence and function of dissolved gases in sea water by boiling it, covering surface with an oil film, and measuring the survival of active marine animals in this compared as to normal sea water.

Field Trips and Collections

1. Field trips to the seashore are especially productive when the habitats are thoroly investigated, as when dead heads of coral are broken up, permanently submerged sand and mud flats are sieved, or algae is washed in bottles of water and the residue examined. Ecological studies along the sea shores may be made to determine how the environmental factors influence the life in the sea; for example, how wave action along a coral reef limits the growth of certain corals; how mud deposited from stream mouths

excludes many forms of life, or how, on wave swept beaches, the animals are adapted to stand the surge of the waves;

2. To demonstrate the existence of planktonic life. Plankton nets may be constructed from a metal or even a stiff rattan hoop and some finely meshed cloth like fine bobbinet, fine-meshed muslin (50-60 meshes per inch), or some curtain material sewn into a cone. Plankton nets may be bought from the larger biological supply houses. When these are towed from a boat, a bridge or a dock in estuarine or open water, they will capture much microscopic life that can be preserved in formaldehyde or studied alive;

3. To collect animal forms of marine life. A flashlight sealed in a glass jar or an electric light on a waterproof cable and taped thoroly with rubber tape suspended in the water on a dark night will attract myriad forms of life, most of which are never encountered during the day;

4. Small balanced marine aquaria can be made if there is ample surface exposed to the air and the tank is not overcrowded with animal life;

5. To observe the spawning and development of the eggs of larger sea urchins or estuarine tube worms which may be collected for the laboratory;

6. To observe the development of some of the smaller shrimp, especially snapping shrimps, which are often found carrying eggs. If the females are kept in the laboratory in a small flat dish of water with some sea weed the eggs will hatch and the larvae, which are a part of the plankton at this stage, may be studied.

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* See also the many high school biology texts which contain useful sections on the ecology of sea life.

[1] Bibliographies listed in order of value for teaching.

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Editorial Notes and News

Have you examined Professional Paper No. 11 on "Problems and Values in the Use of Color Transparencies" with a list of sources—25 cents? Write to M. Melvina Svec, Secretary, NCGT, State Teachers College, Oswego, New York.

The Pan American Union, Washington 6, D.C., announces it has for free distribution a resource unit on Mexico and a small poster on Brazil, with two pictures and two pages of texts. The Mexico unit is useful on both elementary and secondary levels, but the Brazil poster is not adapted to use below the fifth grade. Teachers requesting these publications are asked to state the name of their school and their grade or subject.

The Convention of the new World Meteorological Organization (WMO) entered into force on March 23, 1950, following its ratification by 30 states, including the United States. Since that time a total of more than 50 states have ratified this Convention.

The new WMO will be a specialized agency of the United Nations, and will succeed the old International Meteorological Organization which has been in existence for some 75 years. The first meeting was held in Paris in March, 1951.

United States Atlases, compiled by Clara Egli Le Gear, Division of Maps, The Library of Congress, contains a list of national, state, county, city and regional atlases in the Library of Congress.

Have you been using the "Section of Climatological Data" prepared for your state? This leaflet is usually published monthly by the Weather Bureaus at state capitals, and may be secured for about fifty cents a year. It contains data collected by the cooperative weather stations in your state. One of these weather stations will be somewhere near your school, if not in your home village or city.

NATIONAL COUNCIL AT WORK

Contributing Members

Names of Contributing Members appeared in the February and April issues of the Journal. Twenty-four additional names are now added to the list for the current year:

Edna Arundel	Annice Davis Elkins	Helen Mixter
Wallace W. Atwood, Jr.	O. E. Geppert	Edith P. Parker
Hermine K. Bauschard	Anna M. Goebel	Sidmon P. Poole
Irma A. Buell	Cordelia Harbeson	Ina C. Robertson
Daisy S. Butgen	Clara M. Hinze	Earl B. Shaw
Berenice M. Casper	Mario A. Jordan (Cuba)	J. Russell Smith
George B. Cressey	Homer E. Knight	M. Melvina Svec
Rosaline G. Dragon	Harriet R. Long	Amy Tenney

Additional names will be added as renewals for the fall months arrive. The complete list of Contributing Members for 1951 will appear on the program copy at the annual meeting in Pittsburgh in November.

Fellows of the National Council

The Constitution of the National Council states that after five or more consecutive years of membership, a person becomes a *Fellow*. Those attaining this status since the last list appeared are: in January—Alvin Johnson, T. W. Mitchell, Floyd E. Perkins, Paul R. Terrill, Carlyle Weiss, Yeadon School; in February—Elinore Cox, Robert Crisler, Elvira Lence de Novo, Jessie L. Duboc, Walton S. Hall, Doris Reek, Pauline Young; in March—Leo F. Callahan, E. E. Hall, C. A. Manchester, Jr., Earl N. Shearer, J. Russell Smith, Sister M. Teresine, Eileen Tufts; in April—James Beck, Thomas A. Clark, Henry W. Kolka; in May—Robert L. Anstey, Lester Baach, Byron K. Barton, Frank H. Bankston, Lyda Belthuis, Dwight Burch, Herbert J. Burgy, Albert Carlson, DePaul Institute, Louis de Rockemont Associates, Inc., Flora Dutcher, Edward Eames, Robert C. Fite, Arch C. Gerlach, Lyle E. Gibson, Zella B. Gillaspey, Marie Harrison, O. J. Hawk, H. H. Hope, Howardine Hoffman, Elmer S. Jack, Mrs. Alvin S. Keinard, E. E. Keso, Jane McCandless, Michael Meyer, Ruth Minto, Hazel R. Newhouse, Dorthea G. Shaffer, Adolf Stone, Edward Taube, Elsie Tuttle, Helen G. Wright, Clifford M. Zierer; in September—Carol Brumby, John W. Coulter, J. Benjamin Kauffman, Marietta C. Wilson; in October—Mary B. Taugher, Amy Tenney, Eugene Van Cleef, Allene Walker; in November—Awilda Bleakney; in December—Lloyd D. Black, Adelbert K. Botts, Norman Carls, Thomas W. Chamberlain, Friends University, Sister Mary Ann Gertrude, Mary Clint Irion, Urban J. Linehan, Kathleen M. McCarthy, Gertrude N. McGinnis, Milton E. Scherer.

If any member of the National Council has not received recognition for his several years of continuous affiliation, please write to the Secretary of NCGT, State University Teachers College, Oswego, New York.

State Coordinators

These names of State Coordinators should be added to the list which appeared in the May issue of the Journal:

Kentucky: Dr. Paul R. Terrell, Western Kentucky State College, Bowling Green.

Michigan: Leo F. Callahan, Junior College, Grosse Ile.

Nevada: Miss Ruth Ann Huntzicker, Principal, Elko.

A number of State Coordinators are actively coordinating the work of their state council with the meetings of the State Teachers Association and other regional conferences. In Nevada, Miss Huntzicker uses tape recordings of meetings and reports in order to reach the widely separated groups at their various meetings.

M. Melvina Svec
Secretary

GEOGRAPHICAL PUBLICATIONS

Wallace E. Pratt and Dorothy Good, **World Geography of Petroleum.** Princeton University Press, Princeton, New Jersey, 1951 (Published for the American Geographical Society). xvii and 464 pages. 60 maps, photographs, tables, bibliography, index. $7.50.

This volume consists of a series of twenty-four articles prepared by twenty authors each of whom has won distinction in his special field. Some of the authors are well-known geographers and geologists while the others are men who have won national and international recognition for their mastery of the intricate scientific and executive problems of the petroleum industry.

The book is well named because its major emphasis is upon the regional distribution of the active and potential areas of petroleum exploitation. More than half of the total number of pages is devoted to the world's petroleum regions. The available space is divided quite fairly into the eastern and western hemispheres and includes also the polar areas and continental shelves. The closing article of this section deals with the major areas of discovered and prospective oil, an article that ably summarized the presently known facts as to proved and probable reserves.

Other special features that should not be overlooked are included but adequate discussion of each cannot here be presented. Among these, the reviewer wishes to call attention to the Foreword by Wallace E. Pratt. While it is designated "A Geologist's Foreword," in less than two pages Mr. Pratt has stated with vivid clarity the essence of geography and the relationships of geography and geology within the border zone of these disciplines.

Petroleum in the ground and the functional organization of the petroleum industry constitute the early chapters of the book and within but forty-six pages they provide the essentials for some comprehension of how petroleum is formed and accumulated, of methods of exploration and exploitation, and of the industrial processes involved in preparing crude oil for use in power plants and motor vehicles. Introductory petroleum geology and industrial geography are here intertwined without confusion.

The closing section deals with the aspects of utilization, and here economic geography speaks boldly indeed. The separate headings tell the story—The Availability of Petroleum, Geographical Aspects of Petroleum Use in World War II, World Patterns of Civilian Utilization, and The Effect of the World Distribution of Petroleum on the Power and Policy of Nations.

Altho the text was prepared by twenty authors, all distinguished in their respective fields, we know that men of that caliber are individualistic in their thinking and in their expression as well; these qualities are in evidence, yet the book reads smoothly without any serious break in style. Dorothy Good deserves special commendation for having welded these articles into a unified whole. It is a contribution par excellence from the American Geographical Society and maintains the high standards characteristic of that organization. The book should be on the desk of every geographer who can read English.

University of Nebraska NELS A. BENGTSON

John Foster Dulles, **War or Peace,** 274 pp. The Macmillan Company, New York, 1950. Paper binding, $1.00; cloth binding, $2.50.

An analysis of the dangerous situation of our world today is presented in a clear, straightforward style. Information necessary to understanding the complications in-

volved in plans to maintain world peace is well organized in the four parts into which the book is divided.

Part I presents The Problem. "The danger is war which is probable—unless by positive and well-directed efforts we fend it off." Under the heading "Know Your Enemy" the author describes the doctrines of Soviet Communism and sets forth his thesis that it is the Communist Party and not the Soviet Union that we need to fear. "The goal is peace" and the real problem is how to achieve a peaceful world.

In Part II the author traces The Policies We Have, explaining briefly steps leading up to the United Ntions and then shows what has been accomplished by the United Nations in Iran, Greece, Korea, Israel, Indonesia, the Blockade of Berlin, Italian Colonies, and in numerous intangible activities, in creating genuine fellowships, advancing education, and other items. In this section there is a concise portrayal of the part played by regional associations such as the Rio Pact of 1947.

Part III: The Measure of Our Foreign Policies gives a summary of postwar foreign policies of the United States. First, "our minus score" is analyzed in the successes gained by Soviet Communism in Central Europe, on the continent of Asia, in the Colonial World, in Africa, in Latin America, and in the development of atomic weapons. Secondly, under the "minus score of communism," our successes in Yugoslavia, in Western Europe, in Greece, and in the United Nations are presented. Finally, the net score shows that the pluses for Soviet Communism outbalance the minuses.

In Part IV the author shows What Needs To Be Done by summarizing his ideas on a future for bipartisanship, developing world organization, western unity, policies in Asia, the role of the military in strategic areas, new techniques, and our spiritual need. In his conclusions the author shows that there is no place for easy optimism about sustained peace, but that there is good reason to believe that peace can be preserved, but it requires directed efforts for which he believes we possess assets no generation has ever had before.

The clear and lucid presentation of facts to uphold the thesis set forth makes this book one that will be useful to teachers and advanced students of geography who are trying to see the impact of political policies and ideas on the changing character of the regions of the world.

Kent State University EDNA E. EISEN

H. Ormsby, **France: A Regional and Economic Geography** (revised by F. J. Monkhouse. E. P. Dutton and Company, New York, 1950. xiv and 525 pages. 103 maps and diagrams. $5.50.

The English publishers of the geographical series of which this volume forms part are to be congratulated on bringing their series up to date. Ormsby's France has been a standard work for twenty years, during which it has become indispensable to the advanced student of Western Europe. It is, however, a book that should be placed only in the hands of the student who already knows his France. Gallic precision and clarity are not its outstanding characteristics, and the tiro will be appalled and discouraged by the wealth of factual data. But the student who already has a good overall picture will find this work valuable.

The revision has been careful but limited. The publishers have not had the book re-set, and, except in the last part, the old paging has been retained. This has gravely hampered the editor, whose emendations have all too frequently been limited to footnotes. He has, however, brought all statistics as nearly up to date as is possible and has redrawn the economic maps. The cartographic skill displayed is certainly no greater than in the first edition. The concluding economic section has been in part rewritten; there is a useful appendix on the wartime changes, and some of the small

slips which occurred in the first edition have been corrected. Perhaps the rest may receive attention in the third. The bibliography has not been added to, and the latest papers and books on regional geography to which the student's attention is drawn are dated 1930.

Indiana University NORMAN J. G. POUNDS

M. R. Shackleton, **Europe: A Regional Geography,** Fourth Edition. Longmans, Green and Co., Inc., New York, xvi and 525 pp. $4.25, 1950.

A certain amount of courage is necessary for one who ventures upon the writing of a geography of Europe today, for necessarily much of such a text becomes out of date almost as rapidly as it is written. However, the author in this instance has built upon an older edition and hence risked less than had she produced a volume *de novo.*

This book is to be commended for its depth of presentation in the sense that it interprets the life of the people in the light of their environment rather than presenting merely a description of environments. It is a good book. However, it must be criticized for still inclining strongly toward the more or less standard European pattern of introducing entirely too much geological and geomorphological material, much of which is irrelevant. And certainly this book is not the place to discuss various theories of the origins of land forms. Yet, it is a decided improvement over so many European texts which present much geological data most of which is not used in interpreting the human aspects of the respective regions. The chapters on Italy and the Iberian Peninsula illustrate this weakness very well.

Since this text purports to treat with the total geography and not one aspect, one wishes there were a more extended consideration of boundary problems and of the struggle of the nations for survival. Germany and the U.S.S.R. are well done, but there appears to be an inadequate interpretation of the economic and social aspects of many other units in the light of their geographic conditions. The chapter, Historico-Economic Summary of The U.S.S.R. is the kind of consideration which would be quite welcome in the treatment of all regions.

The "maps" are clear, and except for some unnecessary geological illustrations, are appropriate. We place the word maps inside quotation marks because many of the drawings in characteristic British fashion, fail to show meridians and parallels, and therefore are not entitled to be designated as maps.

Selected brief bibliographies accompany each chapter and a few statistical tables are printed in a series of appendices.

Ohio State University EUGENE VAN CLEEF

Rachel Carson. **The Sea Around Us.** Oxford University Press, New York, 1951. 230 pages, illustrations, index, references. $3.50.

Anyone who has ever come under the spell of the marching waters of the vast oceans, felt the magic and mystery of restless seas that encircle our globe, will find in Miss Carson's book a most delightful story. This book offers more than an expanded chapter on oceans, so frequently treated in texts on physical geology. It is a delightfully informative book concerning the dominant feature of our earth's surface, and, dealing as it does with highly scientific material, nevertheless is written in a fine literary style, in non-technical language that makes it readily acceptable to all classes of readers. The material is the most recent available, and in some sections deals with data obtained from oceanographic studies as recent as 1951 and to date unpublished in book form.

In the first chapter the author gives the reader the most authentic theories in regard to the origin of oceans and their waters and traces the development of life forms in the

primal sea. From these "Gray Beginnings," the author takes up such topics as the configuration of the sea bottom, the effect of seasons on seas and marine life, deeps in the sunless seas, the hidden lands, the birth of an island. In other sections of the book the tides, currents, and their marine life are treated. The chapter on "The Global Thermostat" stands out as a highlight in the text.

The book is illustrated, has an index and contains a well selected bibliography for further reading on the oceans and their life forms.

Geographers will find the book a valuable reference. Altho Miss Carson is a marine biologist, thruout the text she shows clearly how man has made workable relations with the sea.

Two awards have been granted the author for her contribution to the science of Oceanography. She has received the Eugene F. Saxton Fellowship to aid in the completion of the book and she is the recipient of the George Westinghouse Science Award for the best of scientific writing in 1950. This last award was granted as a result of the chapter on "The Birth of an Island."

State Teachers College INA CULLOM ROBERTSON
Valley City, North Dakota

Stewart Schackne and N. D'Arcy Drake. **Oil for the World.** Harper and Brothers, New York, 1950. 128 pages, charts, maps, diagrams, illustrations. $2.50

The authors characterize their book as "a brief introduction to the subject of oil written for the general public." Thus *Oil for the World* is written and illustrated in such a manner as to make it a valuable supplementary reader on the subject for both high school and college students.

The textual material is quite readily understandable due largely to the minor use of scientific terms and to the explanations of such petroleum terminology as is used. With such terminology explained, the student can readily grasp the ideas expressed in this informative book.

Illustrations of great variety and high quality constitute a valuable part of this book. Many of them challenge the interest of the reader and all of them point up the thought expressed in the textual material. The maps showing "Oil Regions of the World" and "World Consumption of Petroleum and Sources of Supply (1949 estimate)" are thought-provoking for students of international affairs. In addition to these maps, there are numerous drawings, photographs, charts, and graphs as well as a map showing "Interstate Pipe Lines" of the United States.

Each of the ten chapters is vitally interesting whether the topic is "Hunting for Oil," "Drilling the Wells," "Oil, the Great Mover," or any of the others. High school students will be stimulated to further study by such statements as: "An oil-driven ship can travel three times as far without refueling as a similar ship using coal" (page 4). "Far out in the Gulf of Mexico oilmen build derricks on steel piers to search for oil below" (page 85). "Under the sand dunes of Arabia lie some of the world's greatest oil reserves" (page 86). "A steadily growing oil industry provides interesting work and opportunity to thousands of men and women" (p. 127).

So that students could have the opportunity to spend considerable time in a study of this book, a few copies should be available in the classroom library and some copies in the school library.

Any teacher *who can make good use of it* may secure a paper-covered copy free (as long as their supply permits) from the Standard Oil Company, 30 Rockefeller Plaza, New York 20, New York.

Senior High School, Quincy, Illinois CLARE SYMONDS

J. Russell Whitaker and Edward A. Ackerman. **American Resources.** Harcourt, Brace and Company, New York, 1951. xi and 477 pages, 76 maps and charts, index of names, index of places. $5.00.

American Resources, Their Management and Conservation, a text written chiefly for college students, is one of the recent books added to the growing list of those dealing with the problems of American resources. Written by two geographers who have long studied the use, misuse, and abuse of our resources, the book, unlike some, is characterized by a realistic and rational approach to the problems of conservation.

The book is divided into five parts exclusive of the Introduction (three chapters) and of the Conclusion. Part I is entitled "Cultivable Land." The six chapters deal chiefly with the importance of soils and the problems of soil management and soil conservation. Part II is entitled "Grasslands and Forest Lands." The first of the five chapters treats the problems of the dry grasslands. The other four chapters are devoted to a study of trees, and forests and forest lands. "Water Resources" is the heading for Part III. The five chapters are devoted to an analysis of the many problems encountered in the use and conservation of the water resources. Part IV is entitled "Minerals and Their Uses." Three chapters deal with the metals and mineral fuels. Part V treats resources of scenic value and wildlife of land and streams and is entitled "Recreational Resources, and Fish and Wildlife."

The book is not a voluminous one packed with a great amount of irrelevant material. It is written with extreme clarity and is well suited to those who have a casual interest in conservation, as well as to college students who may wish to make a more academic inquiry into the subject. The book is well balanced in its treatment of the various resources. Undue emphasis has not been placed on any one resource. Altho the authors consider resource destruction and impairment and the measures adapted to correct or check them the world over, the chief emphasis is on the United States.

The book is illustrated with 76 informative maps and charts. It has an index of names as well as an index of subjects.

The book is a valuable contribution and it should be readily available to all who wish to study the problems of American resources and to see these problems in their proper perspective.

Southern Illinois University FLOYD F. CUNNINGHAM